

AMENDMENTS TO THE CLAIMS

Claims 1-91 (Canceled)

Claim 92 (Currently Amended) ~~The manufacturing apparatus claim 91, further comprising:~~ A manufacturing apparatus of manufacturing a printed wiring board, comprising:

a feed roller for conveying a printed wiring board;

a plurality of nozzle pipes each having a plurality of spray nozzles mounted thereon;

an oscillating mechanism for oscillating the nozzle pipes;

a pump for supplying a treating solution to the nozzle pipes;

pressure-proof flexible tubes disposed between the nozzle pipes and the pump, respectively;

first support members for supporting the nozzle pipes capable of being oscillated, respectively,

the nozzle pipes penetrating the first support members;

second support members for supporting the first support members movably in a specific direction, respectively;

a supporting mechanism for supporting the second support members movably in a vertical direction to the specific direction;

first flexible bellows members disposed at the second support members at both sides of the first support members, for covering a region where each of the first support members moves; and

second flexible bellows members disposed at both sides of the second support members, for covering regions where the second support members move.

Claims 93-96 (Canceled)

Claim 97 (Currently Amended) ~~The manufacturing apparatus of claim 96, further comprising:~~ A manufacturing apparatus of manufacturing a printed wiring board, comprising:

a feed roller for conveying a printed wiring board;

a plurality of nozzle pipes each having a plurality of spray nozzles mounted thereon;

an oscillating mechanism for oscillating the nozzle pipes;

a pump for supplying a treating solution to the nozzle pipes;
pressure-proof flexible tubes disposed between the nozzle pipes and the pump, respectively;
wherein the oscillating mechanism oscillates the nozzle pipes independently;
wherein the oscillating mechanism comprises:

cams;

link mechanisms; and

control motors; and

flexible wires for coupling the oscillating mechanism and the nozzle pipes, respectively.

Claims 98-102 (Canceled)

Claim 103 (Currently Amended) ~~The manufacturing apparatus of claim 102, further comprising:~~
A manufacturing apparatus of manufacturing a printed wiring board, comprising:

a feed roller for conveying a printed wiring board;

a plurality of nozzle pipes each having a plurality of spray nozzles mounted thereon;

an oscillating mechanism for oscillating the nozzle pipes;

a pump for supplying a treating solution to the nozzle pipes;

pressure-proof flexible tubes disposed between the nozzle pipes and the pump, respectively;

first support members for supporting the nozzle pipes capable of being oscillated, respectively,

the nozzle pipes penetrating the first support members;

second support members for supporting the first support members movably in a specific direction, respectively;

a supporting mechanism for supporting the second support members movably in a vertical direction to the specific direction;

moving means for moving the first and second support members;

control means for controlling the moving means to control moving positions of the first and second supporting means;

means for storing dimension data of the printed wiring board; and

a passage supplying the dimension data to the control means.

Claims 104-109 (Canceled)

Claim 110 (Currently Amended) A method of manufacturing a printed wiring board using a manufacturing apparatus which includes:

 a feed roller for conveying a printed wiring board;
 a plurality of nozzle pipes each having a plurality of spray nozzles mounted thereon;
 an oscillating mechanism for oscillating the nozzle pipes;
 a pump for supplying a treating solution to the nozzle pipes;
 pressure-proof flexible tubes disposed between the nozzle pipes and the pump, respectively;
 first support members for supporting the nozzle pipes capable of being oscillated, respectively,
 the nozzle pipes penetrating the first support members;
 second support members for supporting the first support members movably in a specific
 direction, respectively;
 a supporting mechanism for supporting the second support members movably in a vertical
 direction to the specific direction;
 moving means for moving the first and second support members;
 control means for controlling the moving means to control moving positions of the first and
 second supporting means;
 means for storing dimension data of the printed wiring board; and
 a passage supplying the dimension data to the control means,
 said method comprising ~~the steps of~~:
 measuring dimension data of the printed circuit board in a vertical direction to a running
 direction of the printed wiring board;
 inputting the dimension data to the means for storing dimension data;
 setting an interval between the nozzle pipes according to the dimension data; and

conveying the printed wiring board while oscillating the nozzle pipes and blowing the treating solution to the printed wiring board.

Claims 111-118 (Canceled)

Claim 119 (Currently Amended) ~~The manufacturing apparatus of claim 113, further comprising:~~

A manufacturing apparatus of manufacturing a printed wiring board, comprising:

a feed roller for conveying a printed wiring board;

a plurality of nozzle pipes each having a plurality of spray nozzles mounted thereon;

an oscillating mechanism for oscillating the nozzle pipes;

a plurality of pumps for supplying a treating solution to the nozzle pipes, respectively;

pressure gauges disposed in passages between the nozzle pipes and the pumps, respectively;

one of an inverter circuit, current control circuit, and voltage control circuit for controlling outputs of the pumps;

wherein the oscillating mechanism oscillates the nozzle pipes independently;

wherein an oscillating angle and oscillating speed of the oscillating mechanism are variable;

means for storing treating area data of each of blocks into which the printed wiring board is divided at a dividing line in parallel with a running direction of the printed wiring board;

means for storing correction data for each of the nozzle pipes;

means for selecting selection data from the correction data;

means for calculating output data for the pumps from the selection data; and

means for controlling outputs of the pumps according to the output data.

Claim 120 (Previously Presented) The manufacturing apparatus of claim 119, further comprising:

control motors for oscillating the nozzle pipes according to the output data, respectively; and

means for controlling a rotating speed of each the control motors.

Claim 121 (Previously Presented) The manufacturing apparatus of claim 119, further comprising:

stepping motors for oscillating the nozzle pipes according to the output data, respectively; and means for controlling a rotating angle or rotating speed of each of the stepping motors.

Claim 122 (Previously Presented) The manufacturing apparatus claim 119, wherein means for controlling outputs of the pumps comprises one of inverter circuits, current control circuits, and voltage control circuits for controlling outputs of the pumps, respectively.

Claim 123 (Previously Presented) The manufacturing apparatus of claim 121, further comprising one of an inverter circuit, current control circuit, and voltage control circuit for controlling a rotating speed of each of the control motors.

Claim 124 (Currently Amended) The manufacturing apparatus of claim 121 + 22, further comprising a control/drive circuit for controlling a rotating angle or a rotating speed of each of the stepping motors.

Claim 125 (Previously Presented) The manufacturing apparatus claim 120, wherein the correction data is an electric signal indicating a treating condition including at least one of a spray pressure, an oscillating speed, and an oscillating angle being set for each of the nozzle pipes.

Claim 126 (Previously Presented) The manufacturing apparatus of claim 125, wherein the means for storing the correction data stores a plurality of correction data corresponding to the treating area data.

Claims 127-138 (Canceled)

Claim 139 (Currently Amended) A method of manufacturing a printed wiring board using a manufacturing apparatus which includes:

a feed roller for conveying a printed wiring board;

a plurality of nozzle pipes each having a plurality of spray nozzles mounted thereon;
an oscillating mechanism for oscillating the nozzle pipes;
a plurality of pumps for supplying a treating solution to the nozzle pipes, respectively;
a plurality of pressure gauges disposed in passages between the nozzle pipes and the pumps,
respectively;

means for storing treating area data of each of blocks into which the printed wiring board is divided at a dividing line in parallel with a running direction of the printed wiring board;

means for storing correction data for each of the nozzle pipes;

means for selecting selection data from the correction data;

means for calculating output data for the pumps from the selection data; and

means for controlling an output of each of the pumps according to the output data,
said method comprising ~~the steps of~~:

calculating the treating area data of each of the blocks from CAD data for drawing a wiring pattern on the printed wiring board;

inputting the treating area data into the means for storing treating area data; and

conveying the printed wiring board while oscillating the nozzle pipes and blowing the treating solution to the printed wiring board.

Claim 140 (Currently Amended) A method of manufacturing a printed wiring board using a manufacturing apparatus which includes:

a feed roller for conveying a printed wiring board;

a plurality of nozzle pipes each having a plurality of spray nozzles mounted thereon;

an oscillating mechanism for oscillating the nozzle pipes;

a plurality of pumps for supplying a treating solution to the nozzle pipes, respectively;

a plurality of pressure gauges disposed in passages between the nozzle pipes and the pumps,
respectively;

means for storing treating area data of each of blocks into which the printed wiring board is divided at a dividing line in parallel with a running direction of the printed wiring board;

means for storing correction data for each of the nozzle pipes;
means for selecting selection data from the correction data;
means for calculating output data for the pumps from the selection data;
means for controlling an output of each of the pumps according to the output data;
control motors for oscillating the nozzle pipes according to the output data, respectively; and
means for controlling a rotating speed of each of the control motors,
said method comprising ~~the steps of~~:
calculating treating area data of each of the blocks from CAD data for drawing a wiring pattern on the printed wiring board;
inputting the treating area data to the means for storing treating area data; and
conveying the printed wiring board while oscillating the nozzle pipes and blowing the treating solution to the printed wiring board.

Claim 141 (Currently Amended) A method of manufacturing a printed wiring board using a manufacturing apparatus which includes:

a feed roller for conveying a printed wiring board;
a plurality of nozzle pipes each having a plurality of spray nozzles mounted thereon;
an oscillating mechanism for oscillating the nozzle pipes;
a plurality of pumps for supplying a treating solution to the nozzle pipes, respectively;
a plurality of pressure gauges disposed in passages between the nozzle pipes and the pumps, respectively;
means for storing treating area data of each of blocks into which the printed wiring board is divided at a dividing line in parallel with a running direction of the printed wiring board;
means for storing correction data for each of the nozzle pipes;
means for selecting selection data from the correction data;
means for calculating output data for the pumps from the selection data;
means for controlling an output of each of the pumps according to the output data;
stepping motors for oscillating the nozzle pipes according to the output data, respectively; and

means for controlling a rotating angle or a rotating speed of the stepping motors,
said method comprising ~~the steps of~~:

calculating treating area data of each blocks from CAD data for drawing a wiring pattern on
the printed wiring board;

inputting the treating area data to the means for storing treating area data; and
conveying the printed wiring board while oscillating the nozzle pipes and blowing the treating
solution to the printed wiring board.

Claims 142-158 (Canceled)

Claim 159 (Previously Presented) The method of claim 110, wherein the treating solution is an
etchant.

Claims 160-163 (Canceled)

Claim 164 (Previously Presented) The method of claim 139, wherein the treating solution is an
etchant.

Claim 165 (Previously Presented) The method of claim 140, wherein the treating solution is an
etchant.

Claim 166 (Previously Presented) The method of claim 141, wherein the treating solution is an
etchant.